NTC STAVEBNÍ TECHNIKA spol. s r.o.

SERVICE MANUAL

Walk-Behind Vibratory Rollers

VVV 600/12
VVV 700/22

"EASY LIFT"

(all versions)

From S/N 1000.

(issued 2/2007)

This service manual is intended as an aid for NTC authorized service organizations. The procedures of maintenance and repairs described within should be always carried out by an authorized service.

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Data, description and illustrations within this manual correspond to the knowledge at the time of printing. The producer reserves the right to modify any part of this manual without notice.

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Revision No.	Content	Date

1. SAFETY INSTRUCTIONS

The safety instructions described in various chapters of the operation manual and other documentation supplied with the machine must be amended with safety instructions valid in the respective country of operation, with special regards to jobsite organization, technology and personnel.

1.1. Transport of the Machine

1. When loading and transporting the machine, fasten the binding means to the respective binding points (see chapter 4, symbols 7 and 8).
2. Before loading on a carrier drain the water tank. Pay special attention when ascending or descending on/from the carrier – the machine may roll over!
2. On a carrier, secure the machine safely to prevent its movement on the bed or its rolling over.
3. When hoisting on a crane, fasten the hook to the central eye. Use rope of sufficient capacity. Only qualified binder is allowed to hook the machine.

-!-DANGER!

Never enter under hoisted machine!

1.2. Maintenance

- Lubrication, maintenance and adjustment of the machine should be done by trained personnel.
- The service intervals as according to the maintenance table should be followed (see chapter 6).
- Before servicing, place the machine on a firm and level area and secure it from accidental move and unauthorized starting.
- Mark the machine with a label "Machine out of operation".
- Carry out service operations only when the machine is at standstill and after the engine cools down.
- Adjustment and other operations which must be done at running engine should be done at presence of another person, who is ready to shut down the engine is case of emergency. Make sure that there is sufficient space free of obstacles around the machine when making adjustments, so that the operator can jump aside in emergency.
- Before servicing, clean thoroughly the machine. Pay special attention to the respective points of servicing.
- Use only suitable and undamaged tools.
- Use genuine spare parts only. The manufacturer does not bear any responsibility for damages arising from use of non-original spare parts.
- When working at night, the whole area must be sufficiently illuminated.
- In case it is necessary to remove covers or other safety devices, these must be put back before putting the machine in operation.
- Bolted connections are to be tightened with prescribed torque and glued - see chapters 3.2.1., 3.2.2., 3.2.3.

DANGER!

Avoid skin burns when draining hot oil.

DANGER!

Hydraulic fluid escaping under high pressure (as when loosening couplings of the hydraulic system) may penetrate your skin and cause serious injury. Therefore first release pressure from the hydraulic system.

1.3. Fire Prevention Instructions

- The flammable liquids used at the machine can be divided into the following classes of fire danger:
  1st class - gasoline
  2nd class – diesel fuel
  4th class - mineral oils, grease

- Do not exchange oil at area, where is danger of fire or explosion.
- Mark the area with tables "No smoking" and "No naked flame".
- The area must be capable to absorb such quantity of flammable liquid that is equal to the capacity of the biggest used container.
- The area must be equipped with fire extinguishers.
- Flammable liquids, such as oil, gasoline or diesel fuel, should be stored in metal drums, barrels, etc.
- The containers must be always properly closed for storing.
- The containers must be placed with the opening up and secured from leaking or dripping.
- The containers must be marked with description of the content and class of fire danger.

NOTE! The hydraulic system of travel is highly sensitive for cleanness of the hydraulic oil. Therefore use always only absolutely clean oil, preferably directly from original containers.

1.4. Environmental and Hygienical Principles

The user of the machine is obliged to attend general principles of health protection and environmental protection, as well as the respective law, regulations and standards that are valid for the specific territory when the machine is used.

- Oil products, paints and solvents are harmful agents. Workers who get into contact should keep general principles of health protection and follow the safety and hygienical instructions issued by producers of such agents.

Pay special care to:

- protection of skin when working with oil products and paints;
- wash your hands properly after work and before meals, treat your hands with suitable reparation cream.

- Oil products, paints and solvents, as well as cleansing and conservation agents should be always kept in properly closed original containers. Do not allow storing of such agents in unmarked cans and bottles as it could be easily interchanged for food and drinks.
- If such agents get into accidental contact with skin, eyes, mucous membranes or if vapors are inhaled, apply immediately the first aid principles. If swollen, seek medical assistance.
- Used operational fluids including used filters and hoses become dangerous waste. Such agents and parts should be liquidated with respect to the respective environmental and health protection regulations.

1.5. Liquidation of the Machine

After termination of its service life, the machine should be liquidated in accordance with the respective environmental regulations. Therefore, we recommend committing such activity to:

- specialized company, which has professional background and the necessary permissions;
- the manufacturer or its authorized service.

The manufacturer bears no responsibility for health not environmental damages arising from insufficient attendance to the above mentioned principles.

2. Basic Technical Data

With control bar	**VVV 600/12**	**VVV 600/12G**
Dimensions	see point 2.2	see point 2.2
Operational weight	560 kg	565 kg
Transport weight	527 kg	532 kg
Frequency	60 Hz	60 Hz
Centrifugal force	12 kN	12 kN
Travel speed - forward	0-5 KPH	0-5 KPH
- reverse	0-2 KPH	0-2 KPH
Max. gradability	20° (36%)	20° (36%)
Water tank capacity	30 l	30 l
Engine	**HONDA**	**HONDA**
Type	GX 200	GX 270
Cooling	air	air
Net power	4,1 kW	6,3 kW
Rated speed	3600 RPM	3600 RPM

With control bar	**VVV 600/12HE**	**VVV 600/12HE3**
Dimensions	see point 2.2	see point 2.2
Operational weight	580 kg	585 kg
Transport weight	545 kg	550 kg
Frequency	60 Hz	60 Hz
Centrifugal force	12 kN	12 kN
Travel speed - forward	0-5 KPH	0-5 KPH
- reverse	0-2 KPH	0-2 KPH
Max. gradability	20° (36%)	20° (36%)
Water tank capacity	30 l	30 l
Engine	**HATZ**	**HATZ**
Type	1B20	1B30
Cooling	air	air
Net power	3,6 kW	5,0 kW
Rated speed	3600 RPM	3600 RPM

With steering wheel	**VVV 601/12**	**VVV 601/12HE**
Total length	2350 mm	2350 mm
Height of control bar	1050 mm	1050 mm
Other dimensions	see table VVV	600/22 (point 2.2)
Operational weight	610 kg	630 kg
Transport weight	577 kg	595 kg
Frequency	60 Hz	60 Hz
Centrifugal force	12 kN	12 kN
Travel speed - forward	0-5 KPH	0-5 KPH
- reverse	0-2 KPH	0-2 KPH
Max. gradability	20° (36%)	20° (36%)
Water tank capacity	30 l	30 l
Engine	**HONDA**	**HATZ**
Type	GX 200	1B20
Cooling	air	air
Net power	4,1 kW	3,6 kW
Rated speed	3600 RPM	3600 RPM

Operational weight – includes oil and full fuel and water tanks.
Transport weight – includes oil, but with empty fuel and water tanks

Engines HONDA are four-stroke, gasoline, air-cooled, single cylinder engines.
Engines HATZ are diesel engines.

Actual output of the engine installed in the machine can be different with regard to various factors, such as operation speed of the engine, operation conditions, maintenance and other factors.
Engine operation speed is not identical with engine rated speed and this is set according to technical parameters of the machine.

With control bar	**VVV 700/22**	**VVV 700/22G**
Dimensions	See point 2.2	See point 2.2
Operational weight	875 kg	880 kg
Transport weight	820 kg	825 kg
Frequency	55 Hz	55 Hz
Centrifugal force	22 kN	22 kN
Travel speed - forward	0-4,7 KPH	0-4,7 KPH
- reverse	0-2,0 KPH	0-2,0 KPH
Max. gradability	20° (36%)	20° (36%)
Water tank capacity	50 l	50 l
Engine	**HONDA**	**HONDA**
Type	GX 270	GX 390
Cooling	air	air
Net power	6,3 kW	8,7 kW
Rated speed	3600 RPM	3600 RPM

With control bar	**VVV 700/22HE**	**VVV 700/22HE4**
Dimensions	See point 2.2	See point 2.2
Operational weight	900 kg	915 kg
Transport weight	845 kg	860 kg
Frequency	55 Hz	55 Hz
Centrifugal force	22 kN	22 kN
Travel speed - forward	0-4,7 KPH	0-4,7 KPH
- reverse	0-2,0 KPH	0-2,0 KPH
Max. gradability	20° (36%)	20° (36%)
Water tank capacity	50 l	50 l
Engine	**HATZ**	**HATZ**
Type	1B30	1B40
Cooling	air	air
Net power	5,0 kW	7,3 kW
Rated speed	3600 RPM	3600 RPM

With steering wheel	**VVV701/22**	**VVV701/22HE**
Total length	2800 mm	2800 mm
Height of control bar	1230 mm	1230 mm
Other dimensions	see table VVV	700/22 (point 2.2)
Operational weight	995 kg	1025 kg
Transport weight	940 kg	970 kg
Frequency	55 Hz	55 Hz
Centrifugal force	22 kN	22 kN
Travel speed - forward	0-4,7 KPH	0-4,7 KPH
- reverse	0-2,0 KPH	0-2,0 KPH
Max. gradability	20° (36%)	20° (36%)
Water tank capacity	50 l	50 l
Engine	**HONDA**	**HATZ**
Type	GX 270	1B30
Cooling	air	air
Rated power	6,3 kW	5,0 kW
Rated speed	3600 RPM	3600 RPM

Operational weight – includes oil and full fuel and water tanks.
Transport weight – includes oil, but with empty fuel and water tanks

Engines HONDA are four-stroke, gasoline, air-cooled, single cylinder engines.
Engines HATZ are four stroke, air-cooled, single cylinder diesel engines.

The Engine power is according to SAE J1349 for HONDA engines and according to ISO 3046-1 for HATZ engines.

Actual output of the engine installed in the machine can be different with regard to various factors, such as operation speed of the engine, operation conditions, maintenance and other factors.
Engine operation speed is not identical with engine rated speed and this is set according to technical parameters of the machine.

2.1 Lubricants:

Motor	Type	Capacity approx.
HONDA	GX 200	0,6 l
	GX 270	1,1 l
	GX 390	1,1 l
HATZ	1B20	0,8 l
	1B30	1,1 l
	1B40	1,1 l

For use in both engine and the vibrator use high-quality engine oils of the following specifications: 15W-40 API SJ/CF

For more information please consult HONDA or HATZ operation manuals

- oil in the vibrator – use engine oil

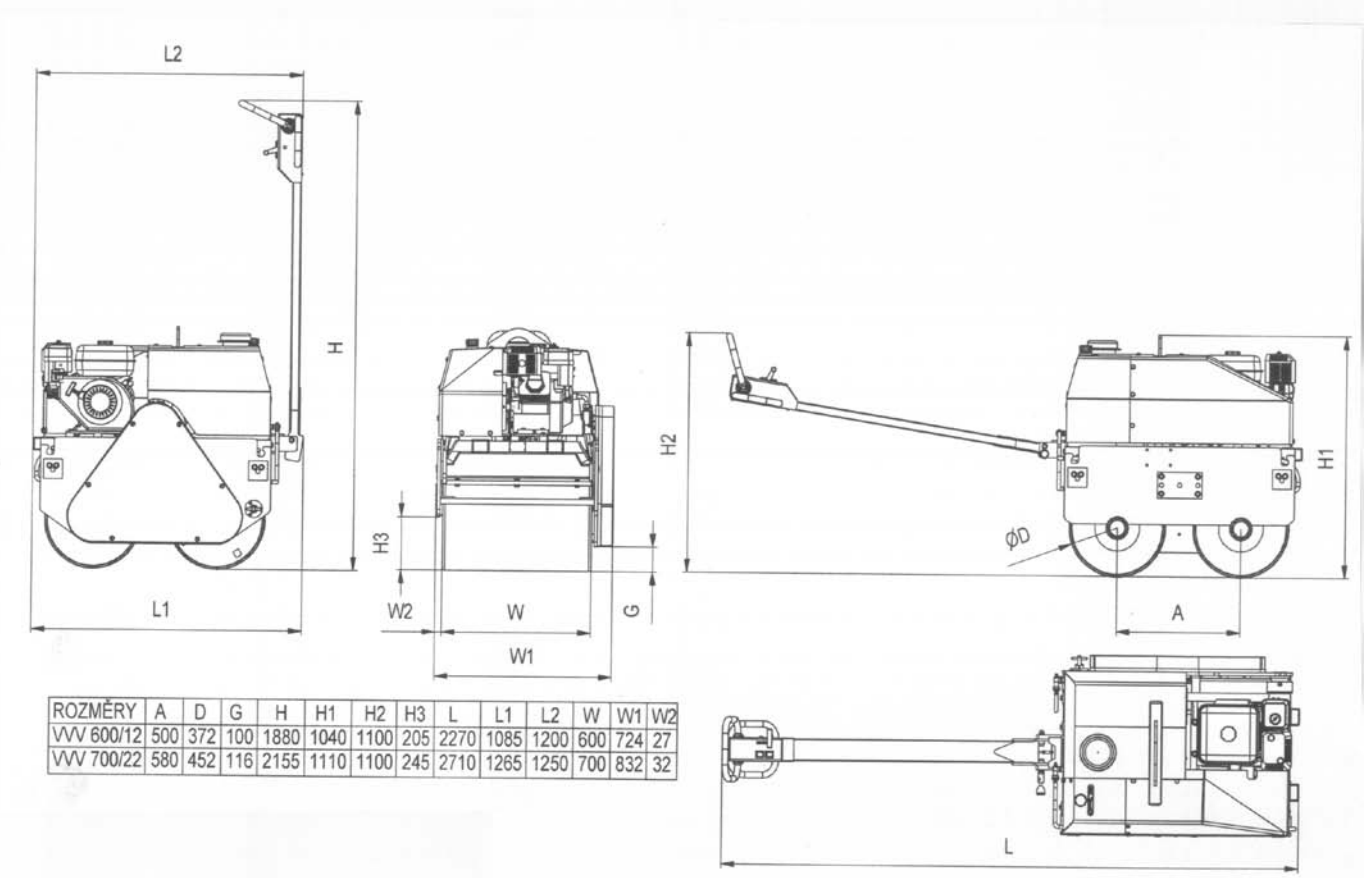
VVV 600/12 - capacity approx. 0,12 l
VVV 700/22 - capacity approx. 0,18 l

- hydraulic oil - OH-HV 68 VVV 600/12 - capacity approx. 9 l
VVV 700/22 - capacity approx. 9 l

2.2 Tyre Inflation

Tyre at rollers VVV 601/12 and 701/22 (with steering wheel) is to be inflated to maximal pressure of 200 kPa.

2.3 Dimensional Chart



ROZMĚRY	A	D	G	H	H1	H2	H3	L	L1	L2	W	W1	W2
VVV 600/12	500	372	100	1880	1040	1100	205	2270	1085	1200	600	724	27
VVV 700/22	580	452	116	2155	1110	1100	245	2710	1265	1250	700	832	32

2.4 Identification

When contacting the manufacturer or dealer (i.e. when reporting a warranty claim, ordering spare parts, contacting service or asking for technical support) have always ready exact type and serial number of your machine. These data are shown at the machine identification plate.

Fig. Machine identification plate

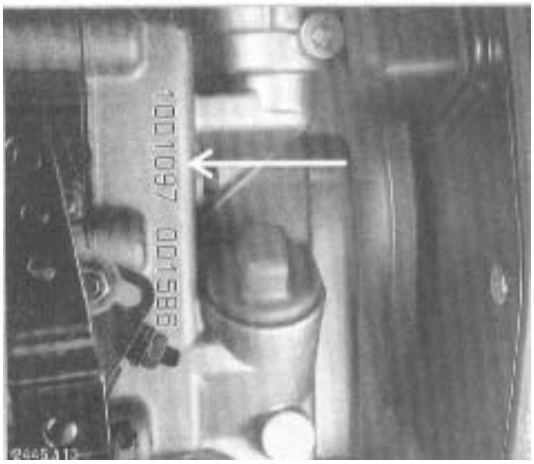
2.5 Engine identification

In case of engine-related problems have ready also the type and serial number of the engine. Such identification is stamped at the engine housing (HONDA) or shown at the identification plate (HATZ). In case of doubts contact the manufacturer.

Fig. Location of identification number at HONDA engines

Fig. HATZ identification plate

Fig. Serial number of HATZ engine



3. Maintenance

3.1. Maintenance of the Engine

- refer to the engine operation / shop manual available from the manufacturer or engine distributor

NEVER ADJUST HIGHER ENGINE SPEED THAN PRESCRIBED BY THE MANUFACTURER!

(Failure to do so would cause damage to the engine and/or the vibrator due to excessive vibrations!)

The manufacturer bears no responsibility for such damages!

3.1.1. Adjustment of Idle Speed at HATZ Engines

Adjust idle speed of HATZ engines by increasing pre-tension of the control cable by means of the adjustment screw above the spring. The engine should be running smoothly and the upper frame of the machine and the battery should not vibrate.

Note: Adjusting of too low idle speed may lead to uneven running of the engine, resulting in damage to the rubber mounts and/or leakage of electrolyte from the battery.

3.2. Disassembly and Assembly

During the warranty period the user is forbidden to carry out any disassembly works except of the prescribed maintenance. All repairs must be done by an authorized service organization.
In case of after-warranty repair, proper disassembly and assembly procedures should be followed in order to ensure expected reliability and service life of the repaired groups of the machine. Especially bear in mind that this is a vibratory machine – therefore all bolted connections should be carefully secured to prevent their releasing during operation. Special attention is to be paid to all bolts at the bottom (vibrating) part of the machine and bolts that fasten the vibrator.

Note: In case that removal of the vibrator is necessary, use always new original bolts of the prescribed size and strength class.
Every machine is supplied with the parts book that contains exploded views of all assembly groups of the machine. Study the parts book carefully before commencing the dismantling operation.

3.2.1. Bolts and Nuts - Securing Procedure

1. Clean carefully the contact area, threads of holes and bolts. Wash with technical gasoline and blow-off with compressed air. Remove all remains of old glue.
2. Apply the contact area and the threads with bonding cement **LOCTITE type 326** and **activator type 7649** (see below).

3. Fasten the bolts and tighten them to prescribed torque with a torque-limiting wrench (see chapter 3.2.3.).
4. Use high-stress bolts, nuts and washers of class 8.8 (8G) only; bolts fastening the vibrator must be of the 10.9 (10K) class. NOTE: The bolts that fasten the vibrator have prescribed lower tightening torque (see chapter 3.2.3.). Follow technological procedure of gluing and the hardening time as recommended by the bonding cement manufacturer.

3.2.2. Instructions for Usage of the LOCTITE Bonding Cement:

To secure important connections, the manufacturer has tested and approved the special bonding cement **LOCTITE, type 326** with **activator 7649**. To reach the requirements, it is necessary to keep the following procedure:

1. The cemented areas must be mechanically undamaged, clean, dry and free of grease (see above). All remains of old glue must be properly removed.
2. The bonding cement should be applied on surface of one part, the activator on the other one.
3. The contact areas should be completely covered with the bonding cement.
4. For large areas, apply the cement in caterpillar pattern; the cement will spread after pushing the parts against each other.
5. When cementing bolts, apply the bonding cement on the thread. Then screw the bolt in and tighten to prescribed torque.
6. For blind holes, apply the cement to lower third of the hole. It will be pushed up along the thread when screwing the bolt in.

Parameters of the cemented connection:

Handling strength: 1-3 minutes
Final strength: 24 hours
Heat resistance: 120°C

3.2.3. Tightening Torques

Bolts that fasten the vibrator to the central cross-beam should be torqued to the following values. Failure to do so will result in damage to the machine.

Machine	Bolt	Strength class	DIN	Torque
VVV 600, 601	M 12x50	10.9 (10K)	6921	75 Nm
VVV 700, 701	M 16x50	10.9 (10K)	6921	75 Nm

Other bolts and nuts (except of that fastening the vibrator) should be torqued as follows:

Bolt	Strength class	Torque
M 5	8.8 (8G)	5,9 Nm
M 6	8.8 (8G)	9,8 Nm
M 8	8.8 (8G)	22,6 Nm
M 10	8.8 (8G)	44,1 Nm
M 12	8.8 (8G)	74,6 Nm
M 16	8.8 (8G)	165 Nm

3.3. Disassembly and Assembly of Bottom Frame and Drums

3.3.1. Dismantling the Upper Part from the Bottom Frame

Remove front cover of the hydraulic pump (fastened with eight bolts M10x20).

Remove water tank. It is fastened with five bolts M10x20 above the control bar, two bolts M10x50 inside and two bolts M8x25 at the strut. Unscrew two cap nuts of sprinkling from the taps. Disconnect the hour counter (if used). Do not remove the oil tank.

Remove four bolts M10x20 that fasten the upper frame to the rubber mounts of the lower frame.

Tilt the upper frame to the side of the drive belts and remove the drive belt from the tensioner pulley to the vibrator.

Remove the triangle chain cover at the RH side. It is fastened with six Allen bolts M12x75. The cover is mostly stuck to the paint and has to be released using a screwdriver or a mallet. NOTE: Keep the chain and sprockets clean when having the cover removed.

Release the chain tensioner. It is fastened with two Allen bolts M12x20 and tensioning screw M12x80 with lock nut. The bolts are secured with gluing. Remove the double-row chain. NOTE: Secure the machine with the parking brake and support with wedges for safety.

Remove the bolt of the hydromotor sprocket M8x25. Using a special puller (fixture No. MP24 for sprocket 16 teeth, No. MP25 for sprocket 27 teeth – available from the manufacturer for special order) remove the hydromotor sprocket. The bolt M8x25 is secured with gluing.

Remove the hydromotor from the side plate. It is fastened with two bolts M12x40. The bolts and the flange are secured with gluing. Do not necessarily disconnect the hydraulic hoses. Use a suitable bronze or aluminum bushing to knock off the hydromotor against the inner part of the flange. NOTE: NEVER KNOCK AGAINST THE HYDROMOTOR SHAFT. Put the released hydromotor aside.

Remove the lifting frame (red). It is fastened with four bolts M12x40 with nuts at the RH side and four bolts M12x25 at the LH side. All bolts, nuts and contact surfaced are secured with gluing. Put the lifting frame aside.

Use a suitable hoisting device to remove the upper frame (including the engine, hydraulic pump, electromagnetic clutch, hydromotor, hydraulic tank, i.e. with completely connected hydraulic system) from the lower frame.

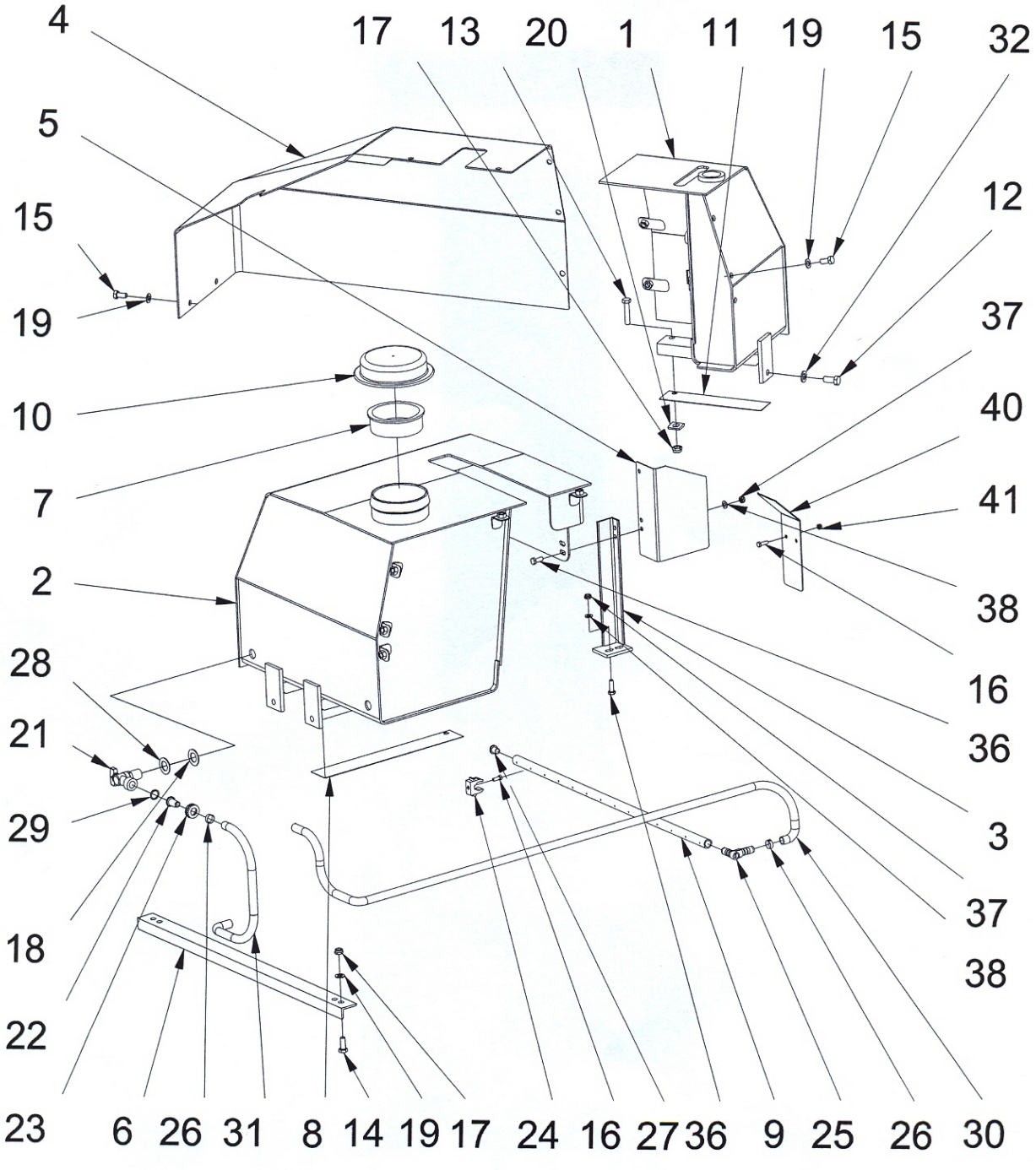


Fig. Parts book group 12 – Sprinkling – Scrapers – Covers

3.3.2. Disassembly of the Bottom Frame

Remove the upper part of the machine from the lower frame (see chapter 3.1.1.).

Unscrew two bolts M10x30 with washers that fasten drum sprockets. The bolts are secured by gluing.

Use a special puller (tool No. MP24 for sprockets 16 teeth, No. MP25 for sprocket 27 teeth, No. MP26 for sprocket 22 teeth) to pull down the drum sprockets.

Unscrew four Allen bolts M16x30 fastening front and rear cross beams to the higher side plate (the one with hydromotor) and four bolts fastening the central cross beam to the same side plate. The bolts are secured by gluing.

At the same side plate, remove bolts of inner and outer scrapers. NOTE: DO NOT ROLL THE FRAME TO THE SIDE WHEN REMOVING THE SCRAPER BOLTS! OIL FROM THE VIBRATOR WOULD ESCAPE THROUGHT THE BREATHING HOLE!

Do not remove bolts M16x30 and M16x35 at the opposite (lower) side plate. Knock-off the higher side plate from the cross beams. The higher side plate is now hold only by five cylindrical pins. The pins and the side plates are secured by gluing.

Pull the drums off the lower side plate.

Knock off lids out of the lower side plate, remove oil seals from both side plates, remove circlips and knock out bearings using a special tool. NOTE: BEARINGS AND OIL SEALS CANNOT BE RE-USED!

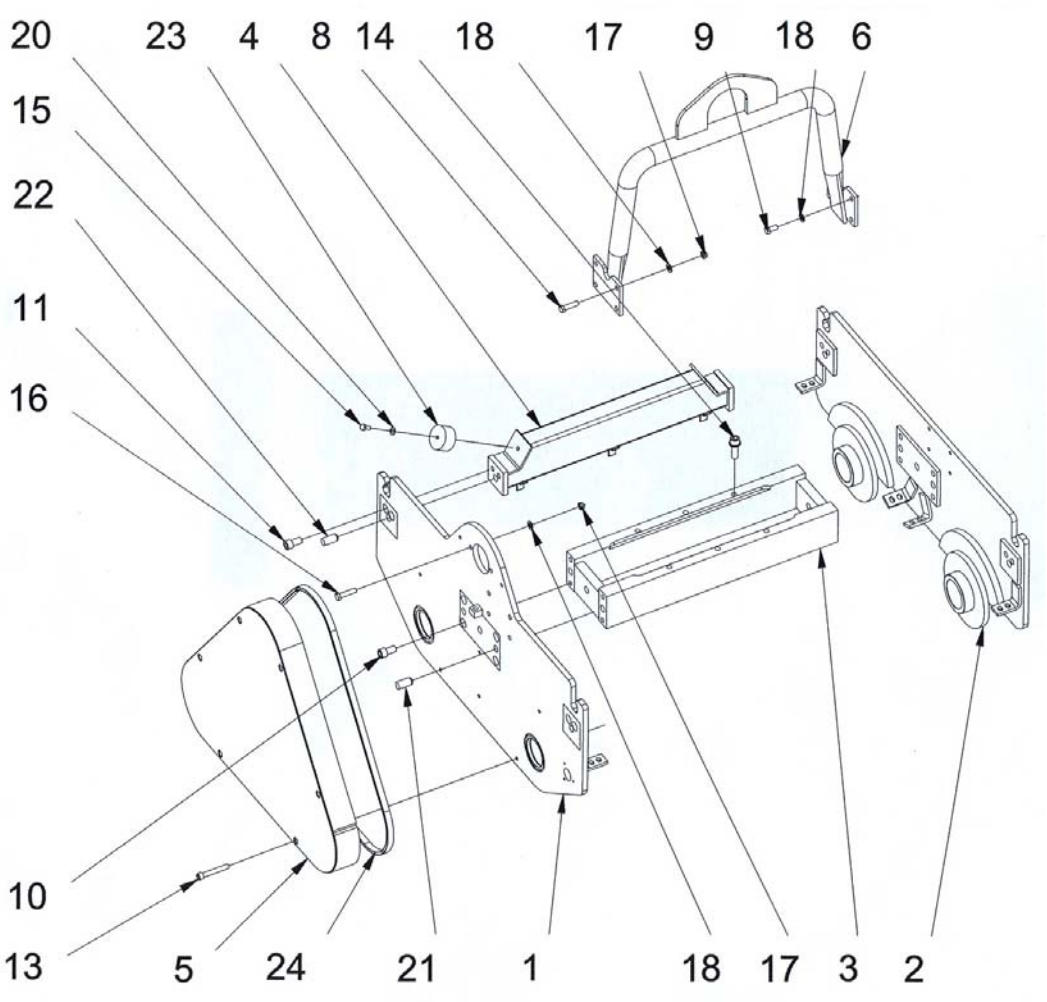


Fig. Spare parts book – group 1. Frame

3.3.3. Assembly of the Lower Frame with the Drums

Clean properly both side pates from rough dirt (mud, sand, hardened concrete, asphalt remains, etc.).

Knock the cylindrical pins at the side plate so that they do not exceed the contact surfaces for the side and central cross beams.

Use sander to sand the contact surfaces in order to remove remains of old glue up to clean metal (six areas altogether). NEVER USE NORMAL ANGLE GRINDER WITH GRINDING, CUTTING OR OTHER DISC, AS THIS WOULD DESTROY THE CONTACT SURFACES!

Fig. Sander

Use a screw-cutter M16 (and M12 for VVV600) to re-cut the threads and remove old glue.

Wipe the side plate off with a cloth and de-grease the contact surfaces with technical gasoline or toluene. THIS OPERATION IS NECESSARY TO AVOID DAMAGE TO NEW BEARINGS AND OIL SEALS.

In case you are re-using original drums, pull down the inner rings of the old bearing off the drum shafts. If the rings under oil seals were damaged at dismantling (see pos. 2, 3 in the parts book), replace them as well.

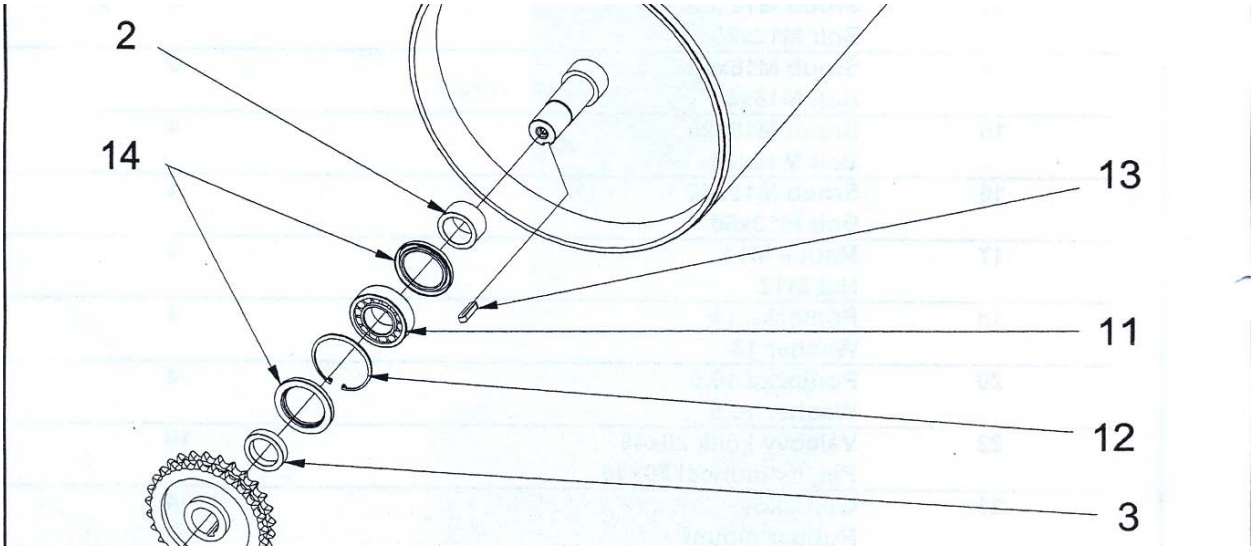


Fig. Installation of the ring under oil seal and inner ring of the bearing

Install circlips inside the side plates and install new bearing and oil seals under a press or using a special tool. Install inner rings onto the drum shafts in such a manner, that each ring matches its original counterpart after final assembly.

Fig. Installation of bearing into the side plate

Fill the bearings in the side plates with plastic grease, i.e. VALAR NLGI 2.

Fig. Bearing filled with plastic grease

Apply the contact surfaces with bonding cement LOCTITE.

Fig. Contact surfaces applied with bonding cement

Have ready the drums and place the lower side plate with the cross beams into the bearings using a hoisting device. Proceed carefully to avoid damage to the new bearings. Let the side plate to hang on the hoisting device and fit manually the other (higher) side plate. DO NOT RELEASE THE LOWER SIDE PLATE FROM THE HOISTING DEVICE; OTHERWISE THE BEARINGS MAY GET DAMAGED. Check whether front and rear drums are not confused (they differ with stops for parking brake, see illustration) and if all scrapers are properly positioned, i.e. below the installation points. Screw the frame together with new bolts and tighten, so that the contact surfaces get pressed against each other. Do not yet tighten to torque. Now release the hoisting device. The screws are to be secured with bonding cement LOCTITE. THIS OPERATION IS TO BE DONE BY TWO TECHNICIANS!

Fig. Drums (the arrow marks rear drum with stops for the parking brake)

Force in the cylindrical pins.

Now tighten the bolts that fasten the side plate to the cross beams to prescribed torque (see chapter 3.2.3.).

Then tighten the scrapers. Use new lock nuts M10 to prevent their releasing.

Fit the rings under the oil seals and press on the sprockets; secure them with washer and bolt M10x30, secure the bolt by gluing. At VVV600, the rings are pressed on the sprockets.

Move the completed frame on the floor and check if all drum bearings are running smoothly and if the scrapers are properly aligned. Adjust the scrapers if necessary.

3.3.4. Installation of the Upper Part onto the Lower Frame

Use a sander to clean the contact surfaces of the lifting frame and contact surfaces of the hydromotor.

Fig. Installation of the lower frame

Fig. Fastening of the hydromotor

Use a hoisting device to place the upper part of the machine onto the lower frame. Do not screw in yet the bolts of the rubber mounts.

Fit on the drive belt from the tensioner pulley to the vibrator.

Now align the upper part, check and/or tension the drive belt (see chapter 3.7) and mount four bolts M10x20 to the rubber mounts. Do not glue the bolts M10x20.

Fig. Aligning of the upper frame

Fig. Bolt of the rubber mount

Apply the contact surfaces of the lifting frame with LOCTITE bonding cement and it to the lower frame with four bolts M12x25 and four bolts M12x40 with nuts. NOTE: USE NEW BOLTS AND NUTS AND SECURE THEM WITH GLUING.

Apply the contact surfaces of the hydromotor with LOCTITE bonding cement and fasten it with two bolts M12x40 with nuts to the side plate. Torque to 74,6 Nm. NOTE: USE NEW BOLTS M12x40 AND NUTS AND SECURE THEM WITH GLUING.

Install the water tank. It is fastened with five bolts M10x20 above the control bar, two bolts M10x50 inside the machine and two bolts M8x25 at the strut. Connect the hour counter (if so equipped). Connect the nuts of the sprinkling system onto the taps.

Install the front cover of the machine. It is fixed with six bolts M10x20 and two bolts M10x30 at the front.

Install the hydromotor sprocket and secure it with bolt M8x25 with washer and torque to 22,6 Nm. NOTE: ALWAYS USE NEW BOLT M8X25 AND SECURE IT BY GLUING.

Fit on the two-row chain and screw-on the chain tensioner. It is fastened with two Allen bolts M12x20 and tensioning screw M12x80 with lock nut. The bolts are secure by gluing. Tension the chain by means of the tensioner, so that the deflection at the longest branch is 6-10mm. Proceed in accordance to chapter 3.6.

Apply the chain with plastic grease, for example VALAR NLGI 2.

Install the triangle chain cover at the RH side of the machine. It is fastened with six Allen bolts M12x75.

Fig. Scrapers at the central cross beam

Fig. Front and rear scrapers

Fig. Front and rear scrapers

3.4. Inspection of Oil Level in the Vibrator

Before checking or exchanging oil in the vibrator, it is necessary first to remove the front cover of the machine and other parts. It is highly recommended to commit these operations to authorized service. The interval for oil exchange is 5 years. Inspect periodically the vibrator for oil leaks.

Oil capacity – see chapter 2.1.

Inspection of oil level is to be done only in case of suspicion to oil leak or after service intervention.

Proceed as follows:

Place the machine on a level surface.

Unscrew the filling and inspection plug at the vibrator. At correct oil level, the oil is even with the opening and oil just stops escaping.

If oil leak is found during operation, the operator must stop the machine immediately and call service. All repair of the vibrator within warranty period may be done by authorized service only; otherwise warranty is void.

3.4.1. Vibrator Removal and Installation

Removal

Remove the upper part of the machine off the lower frame – see chapter 3.3.1.

Release the bolts that fasten the vibrator to the central cross beam. Heat them up (i.e. with a hot air gun) to approx. 150°C to release the glue, otherwise you would break the bolts. Unscrew the bolts and remove the vibrator.

Installation

Clean and de-grease the contact surfaces of the central cross beam and the vibrator, apply them with bonding cement (see chapters 3.2.1. and 3.2.2.) and fit the vibrator onto the frame.

Screw the vibrator with new genuine bolts (see lower table in chapter 3.2.3.). Apply the bolts with bonding cement, screw in, tension to prescribed torque (see lower table in chapter 3.2.3.).

Install all previously removed parts.

In case that the vibrator has got loose during operation, the contact surfaces of the vibrator and the central cross beam must be re-milled before installation.

NOTE:

Low oil level may lead to serious damage to the vibrator bearings.

High oil level will lead to increased temperature of the vibrator, will cause lower engine speed or will cause the engine to stop, or may cause other damage to the machine.

Fig. Plugs of the vibrator

3.4.2. Exchange of Oil in the Vibrator

Disassemble the upper frame of the machine from the bottom part (see chapter 3.3.1.).
Unscrew the filling and inspection plugs and turn the bottom frame upside down.
Let used oil to run out. Follow the instructions as per point 1.3.
Turn the bottom part back to normal position. Fill new engine oil (15W40) and replace the plugs.
Gradually mount and re-connect all parts and groups dismantled before (see chapter 3.3.4.).

3.5. Exchange of Control Cable

3.5.1. Dismantling

Remove the front cover above the hydraulic pump and the cover at the bottom part of the control bar.
Unscrew fastening nuts of the control cable in the control bar, disconnect and remove the fork, remove the plastic and rubber gaiters.
Disconnect the joint of the control cable from the return-to-neutral mechanism of the hydraulic pump and release the fastening nuts at the holder of the pump.
Notice now where is the cable led, where and to what it is strapped and what is the shape and diameter of the loop (should you make the radius too tight, the cable might get damaged). Remember the position of the fastening nuts M18 at the control cable.
Pull the cable out of the machine.

Fig. Connection between the control cable and the hydraulic pump

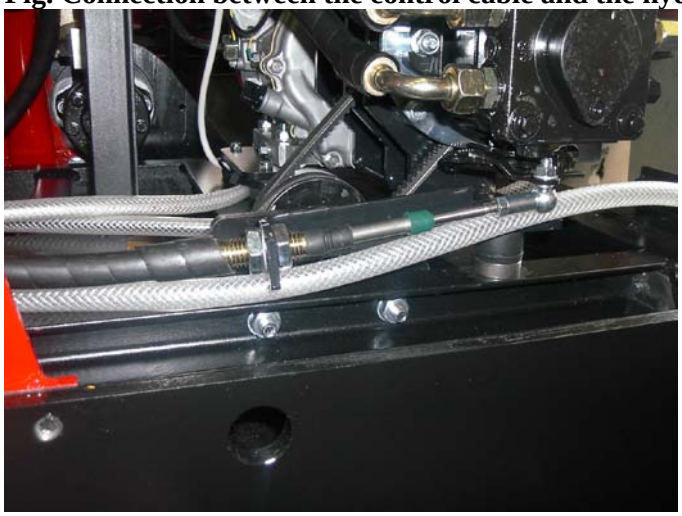


Fig. Route of the control cable through the machine

3.5.2. Installation

Unscrew the fork with the nut M8 at one end of the cable, remove the plastic and rubber gaiters and unscrew the fastening nuts incl. the fan-washers.

Slide the cable through the control bar. Adjust the position of the cable at the machine.

Replace the rubber and plastic gaiters.

Mount the fastening nuts, the fork and the joint into the same position, as the cable had before dismantling (see chapter 3.5.1. paragraph 4).

At the control bar side connect the fork to the lever and secure with the nut. NOTE: The thread must not get into touch with the lever, otherwise the cable breakage may occur. Should that happen, loose the fork be several revolutions and re-secure with the nut.

Check the function of the return-to-neutral mechanism. At engine running and travel control released, the machine should not creep. Adjust of necessary (see chapter 3.9.2.).

Replace the front cover and the cover at the bottom of the control bar.

Fig. Installation of the control cable in the control bar

3.6. Tensioning of the Chain

We recommend to check tensioning of the drive chain once a year, before the season begins.

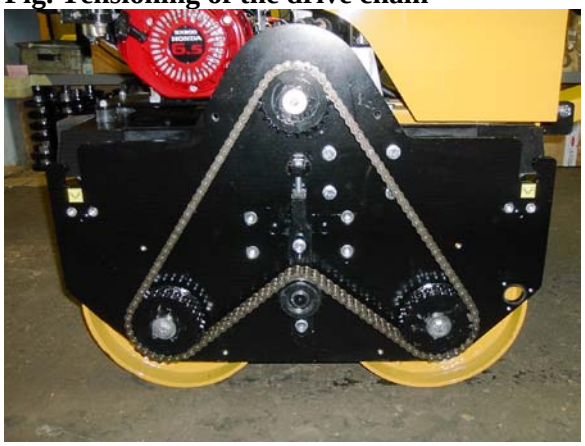
First, dismantle the chain cover.

If possible, suspend the machine for tensioning on a suitable hoisting device, so that both drums are slightly above ground. If not possible, you may lift the machine using a jack or at least “rock” the machine pushing the control bar down (avoid pushing down the control bar!) in order to equalize tension at the individual branches of the chain.

Tension the chain with the tensioner, so that the deflection at the longest branch is 6-10mm.

All screws are secured with a glue. After tensioning the chain, glue the screws again (see chapters 3.2.1., 3.2.2.).

Fig. Tensioning of the drive chain



3.7. Tensioning of Drive Belts

a) Drive belt from the vibrator to the tensioning pulley (the layshaft)

Remove the front cover before tensioning the drive belts.

This drive belt must be always rather loose, for it connect the upper and the lower part of the machine and these part are moving against each other.

Deflection of the drive belt under finger pressure should be about 10-15mm (with water tank full).

Tension of this drive belt may be adjusted by lifting of the upper part of the machine. Loose tow read bolts M10x20 connecting the upper plate with the rubber mounts of the lower frame and lift the plate as necessary. Re-tighten the bolts. Repeat the same procedure for the front bolts. Check the drive belt deflection and re-install the front cover.

b) Drive belt from the tensioning pulley (the layshaft) to the hydraulic pump

Deflection of this drive belt should be about 5-10 mm.

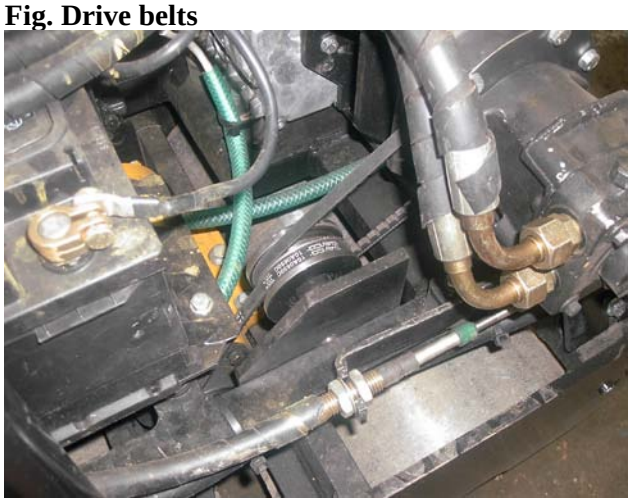
Use the tensioning pulley (the layshaft) to tension this belt.

Release the tensioning pulley (the layshaft).

Slide the pulley in the splines up or down as necessary to adjust the drive belt.

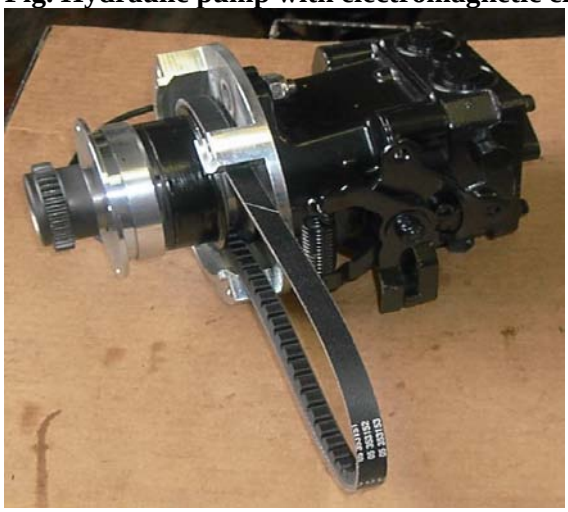
Re-tighten the pulley for the prescribed torque 74,6 Nm. SECURE THE NUTS OF THE TENSIONING PULLEY WITH GLUING. Re-install the front cover.

Fig. Drive belts



3.7.1. Exchange of the Drive Belts

Fig. Hydraulic pump with electromagnetic clutch, pulley, drive belt and a part of splined coupling



a) Exchange of lower drive belt

Remove the front cover of the machine.

Release the tensioning pulley (the layshaft) and remove the upper drive belt off the tensioner pulley.

Remove the old lower drive belt and fit a new one on.

Replace the upper drive belt onto the tensioner pulley.

Tension the upper drive belt shifting the tensioner pulley and torque the tensioner bolts to 74,6 Nm. SECURE THE NUTS OF THE TENSIONER PULLEY (THE LAYSHAFT) BY GLUEING.

Replace the front cover.

b) Exchange of the upper drive belt

Remove the front cover of the machine.

Release the tensioning pulley (the layshaft) and remove the upper drive belt off the tensioner pulley.

Unscrew the coil of the electromagnetic clutch. It is fastened with four bolts M5x16 with lock nuts M5. **Do not disconnect hydraulic hoses and the control cable from the pump.** Unscrew 5 bolts with lock nuts at the flange and slide the whole group of the hydraulic pump with electromagnetic clutch, pulley and the drive belt out of the carrier.

Replace the old drive belt.

Slide the group of the hydraulic pump, electromagnetic clutch, pulley and new drive belt back into the carrier. Pay care to proper connection of the splined coupling.

Fasten the group of hydraulic pump with the flange back into the carrier using bolts M8x45 with lock nuts. ALWAYS USE NEW LOCK NUTS!

Turn the coil of electromagnetic clutch so that the wires are directed upwards and inside the connection.

Screw coil of the electromagnetic clutch using the bolts M5x16 with lock nuts. **NOTE: THE COIL OF THE ELECTRIMAGNETIC CLUTCH MUST BE CENTERED TOWARDS THE ROTOR FOR 2,4 – 2,6 mm USING FEELER GAUGES. FAILURE TO CARRY OUT THIS OPERATION WILL LEAD TO DAMAGE OF THE ELECTROMAGNETIC CLUTCH (see chapter 3.8.).** Always use new lock nuts. Do not forget to fasten the earthing wire of the clutch. THIS OPERATION SHOULD ALWAYS BE CARRIED OUT BY AN AUTHORIZED SERVICE.

Connect the connector of the clutch.

Fit the new upper drive belt onto the tensioner pulley (the layshaft).

Tension the belts as per chapter 3.7., fasten the tensioner pulley and tighten the bolts to prescribed torque (74,6 Nm). SECURE THE NUTS OF THE TENSIONER PULLEY BY GLUEING.

Replace the front cover.

3.8. Checking the Electromagnetic Clutch

The electromagnetic clutch makes one assembly group together with the hydraulic pump. Its function is to turn vibration ON/OFF. The clutch used at the roller is of high quality, ensuring long service life.
In order to ensure fault-free operation of the clutch pay care to keep the clutch clean. If it becomes dirty, the clutch may either keep hold when de-energized, or slip when energized. Both may result in overheating and its excessive wearing and damaging.
Remove dirt from between the friction plates by means of a thin metal sheet, i.e. a feeler gauge or blow it off.
A new clutch is factory adjusted to proper clearance. This clearance needs no adjustment for the whole service life of the machine.

To check proper function:

1. Let the engine idle, the vibrator OFF. Then check, if the clutch does not get warm (turn the engine off first, then check by hand). If the clutch does get warm, the adjusted clearance is too small, or the friction plates are dirty.
2. Test the roller with vibration (operate the roller at full throttle). If the clutch slips when turning the vibrator ON (insufficient vibration, irregular run) the adjusted clearance is too large, or the friction plates are greased.

The clearance between the friction plates (approx. 0,15-0,45mm) can be checked by a feeler gauge. Special tools and fixtures (puller with pin, side-ended eye spanner No. 8 and 13, cross-head screwdriver, ratchet with extension and socket spanner No. 10) are required for disassembly of the clutch. For proper assembly, a set of spacer rings and feeler gauges are required.

The rotor from the electromagnetic clutch used at the older version cannot be used at this version of rollers. The new version has increased air gap and bigger hole for the shaft.

Fig. Puller with pin for removal of clutch shaft from the hydraulic pump clutch

All special tools listed in this manual can be ordered from the manufacturer.

Fig. Electromagnetic clutch

For adjustment of proper clearance between the clutch plates always use genuine spare parts. Removal and installation of the hydraulic pump should be done by trained technician only.

3.8.1. Assembly of the Electromagnetic Clutch

1 – Sub-assembly A (with solenoid)

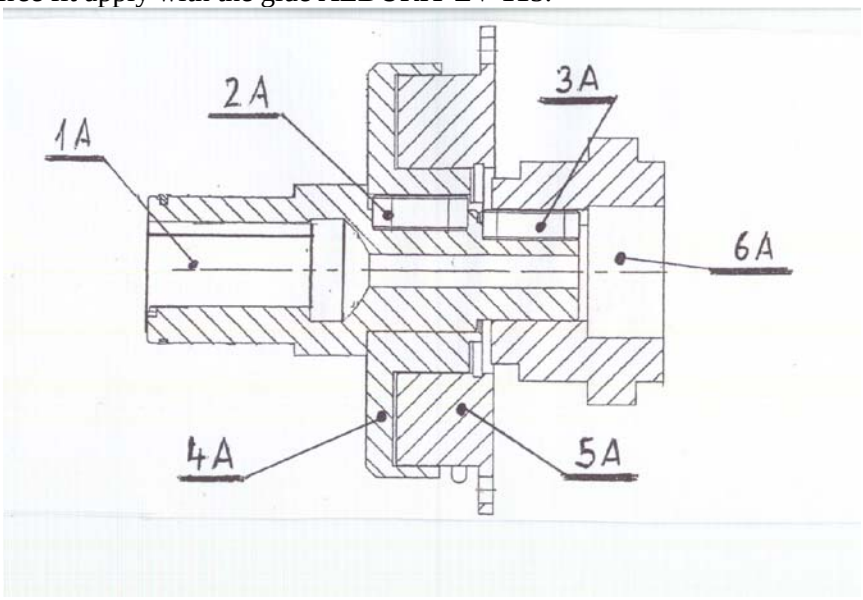
Knock the key 8x7x20 (pos. 2A) to the shaft (pos.1A).

Press the rotor of the electromagnetic clutch (pos. 4A) onto the shaft (pos.1A).

There is a transition fit between the clutch rotor and the shaft. In case of the overlap fit apply the shaft with oil and press the parts together, in case of a free fit apply with the glue ALDURIT ZV 115.

Knock the key 6x6x20 (pos. 3A) to the shaft (pos. 1A) and fit on the solenoid stator (pos. 5A).

Press the gear coupling (pos. 6A) on the shaft (pos. 1A). There is a transition fit between the gear coupling and the shaft. In case of the overlap fit apply the shaft with oil and press the parts together, in case of a free fit apply with the glue ALDURIT ZV 115.



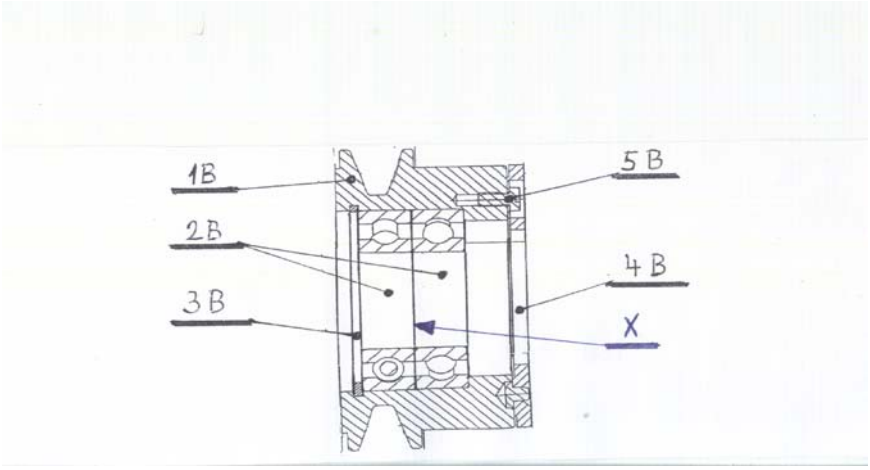
2 – Sub-assembly B (with pulley)

Apply the bearings with different grease. Choose grease of high thermal resistance.

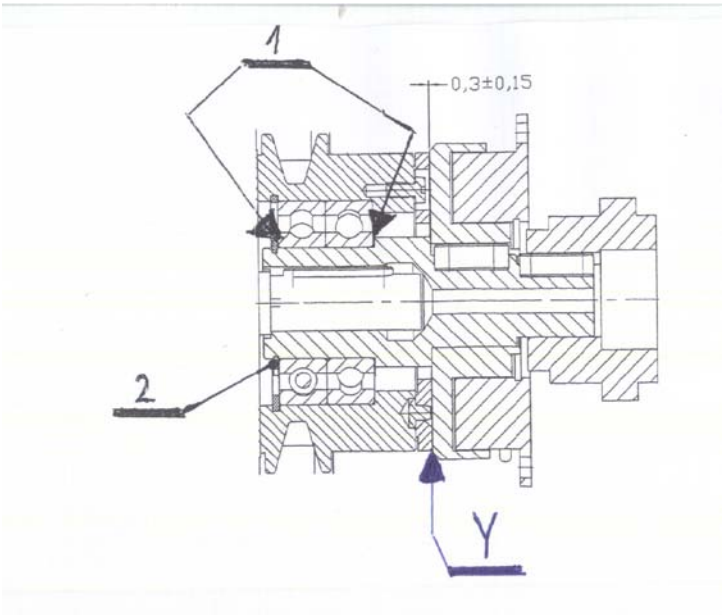
Remove one cover from each bearing, wash it properly in order to remove all old grease and apply new grease LGHP 2 (SKF). Replace the cover.

Press the bearings (pos. 2B) into the pulley (pos. 1B), so that the cover previously removed was between the bearings (surface X). Secure with circlip dia 55 (pos. 3B). See to it that the bearings prop themselves upon this circlip.

Screw the clutch plate (pos. 4B) to the pulley (pos. 1B) with bolt M4x8 (pos. 5B). Secure the bolts with glue ALDURIT ZV 115.



Properly clean and de-grease contact surfaces of the plate and clutch rotor (surfaces Y). The sub-assembly A slide into the sub-assembly B, using the spacer rings (pos. 1 - 0,2 and 0,3mm thick) that are to be placed onto the shaft (sub-assembly A, pos. 1A) ahead or behind the bearings (sub-assembly B, pos. 2B) as needed. Adjust the clearance to approx. 0,3mm – see picture. Secure with circlip dia 30 (pos. 2).



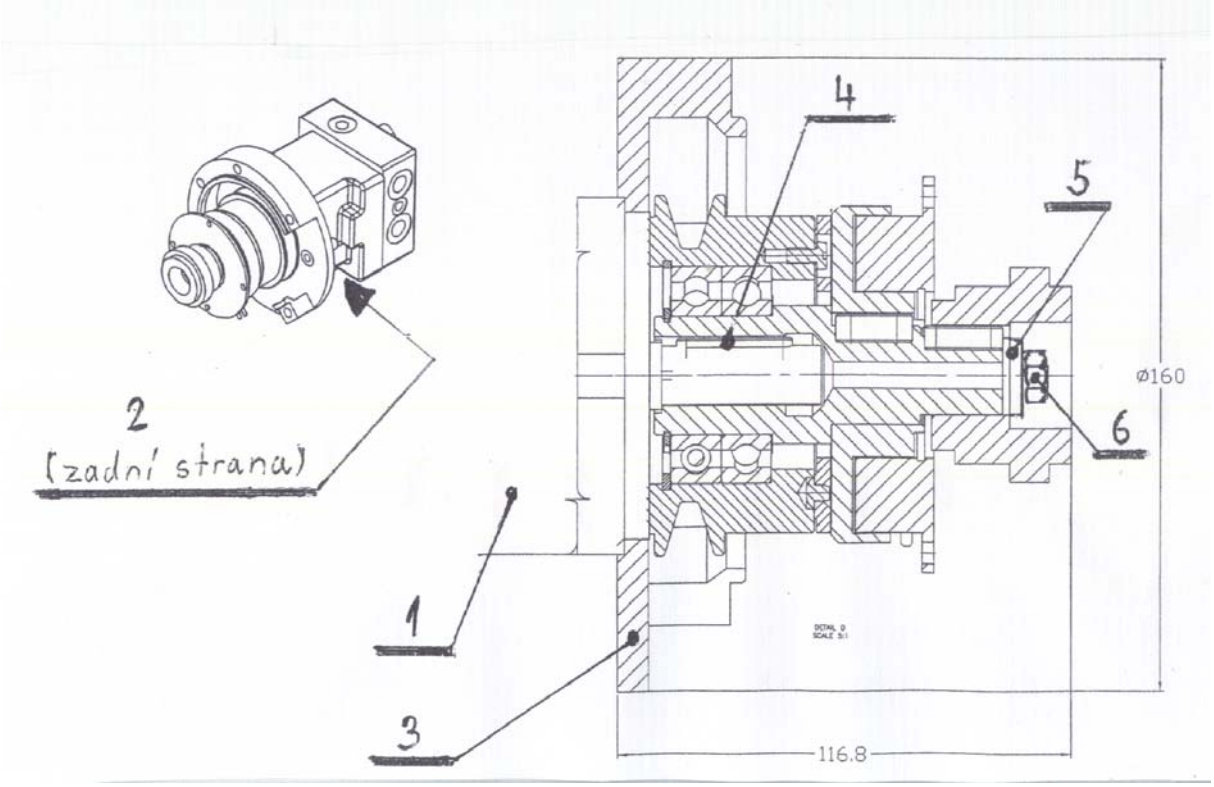
Fasten the pump cover (pos. 3) onto the hydraulic pump (pos. 1) using two nuts M10 (pos. 2).

Knock the key 5x5x30 (pos. 4) to the pump shaft (pos. 1).

There is a transition fit between the pump shaft and the electromagnetic clutch. In case of the overlap fit apply the pump shaft with oil and press the parts together, in case of a free fit apply with the glue ALDURIT ZV 115.

Before pressing the parts together set carefully the key on the pump shaft against the groove in the clutch shaft. Note: Surfaces Y must stay clean.

Secure the whole assembly with bolt M6x70 (pos. 6) with washer (pos. 5). Glue the bolt with ALDURIT ZV 115.



Do not forget to install the drive belt during the assembly.

Tighten the bolts M8x45 (fastening the pump cover and the pump carrier) and bolts M5x16 (fastening the stator and the pump carrier). Always use new locking nuts.

3.9. Installation of a New Hydraulic Pump

Installation of a new hydraulic pump should be done by trained service technician only.
The hydraulic pump makes one group with the electromagnetic clutch (see parts boo group 9).
Special tools and fixtures are needed for dismantling of the hydraulic pump (such as: puller with pin, side-ended eye spanner No. 8 and 13, cross-head screwdriver, ratchet with extension and socket spanner No. 10). A set of spacer shims and feeler gauges are necessary for assembly of new hydraulic pump. Use genuine parts only.
When installing the hydraulic pump, it is also necessary to check the neutral position of the travel control and maximum speed in reverse. Proceed as follows:

1. Install the hydraulic pump with the electromagnetic clutch. Connect hydraulic hoses. Replenish hydraulic oil (see 3.10.1.).
2. Connect the travel control cable to the control lever of the hydraulic pump (see 3.5).
3. Turn the adjustment thread on the control cable (from below of the control bar) to adjust the position of the travel control lever, so that it is about in the centre of its stroke.
4. Using the return-to-neutral mechanism adjust the neutral position, so that the machine stays still at engine running and travel control lever released.

Caution: This operation has to be done at engine running and engine covers removed. Pay high attention to safety! See chapter 1.2.

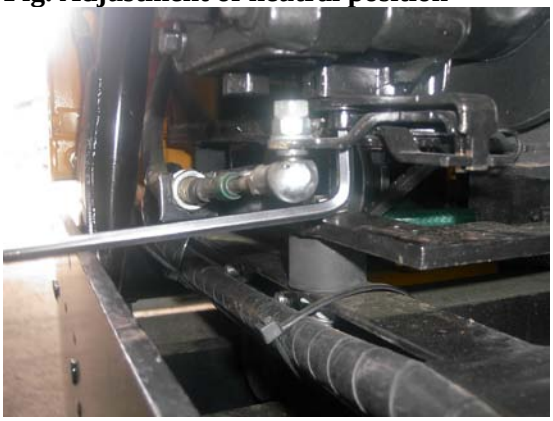
3.9.1. Adjustment of Travel Speed in Reverse

The safety standards for walk-behind rollers sets up maximal speed in reverse to 2,0 KPH. This maximum speed is secured by the structure of the whole control system (fixed limits inside the control handle) and cannot be increased. Should you try to increase the speed in reverse by means of the fork at the end of the control cable, it would cause high tension of the cable and would shorten its service life. The manufacturer will not honor any warranty claims caused by unauthorized repairs and modifications.
The forks and pins at the ends of the control cables are adjusted in such manner, that the roller passes 25m in 45-48 sec. Re-adjustment is necessary after exchanging the control cable.

3.9.2. Adjustment of neutral position

In case that the machine travels at released travel control lever, neutral position should be re-adjusted.
Remove the front cover of the machine.
Use the Allen wrench to loosen the screw with inner hexagon. Slightly move the whole mechanism of neutral position on the hydraulic pump in order to adjust the neutral position. The machine should be at standstill when the engine is running and the travel control lever released.
Re-tighten the Allen screw.
Replace the front cover.

Fig. Adjustment of neutral position



DANGER! This procedure must be done at running engine and removed cover of the engine compartment. Pay utmost care of safety (see chapter 1.2). Roller may move when adjusting. Therefore, this procedure should be done by 2 technicians, one of them being ready to shutdown the machine. Keep the area around the machine clear of obstacles, so that the operator may in time jump aside out of the path of the roller.

3.10. Maintenance of the Hydraulic System

-!- No user intervention into the hydraulic system is allowed during warranty!

Visually inspect the hydraulic system for possible leaks. In case of any failure of the hydraulic system during warranty, call authorized service.

After warranty, maintenance is limited to regular visual inspection of the hydraulic system for possible leaks, regular checks of the hydraulic oil level (see chapter 6 - Maintenance chart) and regular exchange of the hydraulic oil and filter.

Possible repairs during the warranty period must be done exclusively by an authorized service. When carrying out any repair of the hydraulic system after warranty, pay special care to cleanness. Clean the point of repair before dismantling. Plug all openings and hoses.

NOTE: Use only clean oil of the prescribed sort (OH-HV 68). Hydraulic oil must be perfectly clean (maximal acceptable of impurities is 10 μm), therefore add oil only directly from original containers or from external filling unit with own filtration.

The cap is secured by a seal. This seal should be kept intact during warranty. Before removing the tank cap, clean the cap thoroughly, to avoid penetration of dirt into oil. The cap has oil dipstick on its bottom. The proper oil level is in the middle of the flat end.

We strongly recommend committing of all servicing operations to authorized service, even after warranty period.

Fig. Hydraulic tank with oil filter

Fig. Hydraulic pump

Fig. Shock-valve

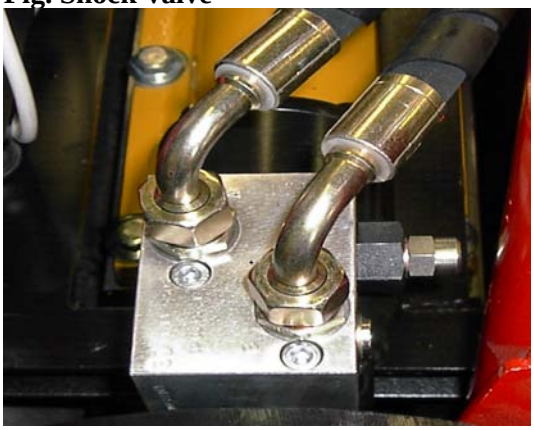


Fig. Plug with dipstick

3.10.1. Exchange of Hydraulic Oil

Hydraulic oil is to be exchanged in regular intervals as according to the maintenance schedule (500 hours or once in two years – see chapter 6).

It is of utmost importance to replace hydraulic oil immediately in case that the hydraulic pump gets seized or in case the hydraulic circuit becomes contaminated (i.e. when dirty oil is filled into the circuit).

In order to ensure proper replacement of hydraulic oil in the whole system, the manufacturer recommends the following procedure:

1. Replace the oil in the hydraulic tank.
2. Replace the oil filter.

3.10.1.1. How to Replace the Hydraulic Oil and the Filter

Clean the hydraulic tank thoroughly.

Remove the hydraulic tank from the frame and the water tank.

Remove the plug (with dipstick) and discharge oil into a suitable container; wash the empty tank (i.e. with technical gasoline).

Replace the hydraulic tank.

Remove the hydraulic filter.

Fill new filter with clean hydraulic oil.

Mount the new filter into the yoke and fasten with the bolts. Apply the bolts with glue.

Fill the hydraulic tank with clean hydraulic oil. Check the proper oil level with the dipstick.

Start the roller and then check the level of hydraulic oil. Add as necessary.

Fig. Hydraulic oil tank mounted on the frame

Fig. Emptying of the hydraulic tank

3.10.2. Shock-Valve

The purpose of the shock-valve is to protect the hydraulic circuit from pressure peaks. The valve comes properly adjusted from the factory. However in case that a particle gets into the valve, it may cause its permanent semi-opening; in such a case the engine is running, but to machine does not move, or stops even on a slightest slope. Cleaning and/or adjustment of the shock-valve may be carried out only by a trained technician.

Clean the shock-valve prior to any intervention.

Properly adjusted shock-valve at VVV 600 has distance between the face of the cylindrical head of the screw with inner hexagon and face of the valve body (see illustration) 12,3 mm; for VVV 700 it is 10,1- 11 mm.

Fig. Adjustment of the shock-valve

Fig. Cleaning of the shock-valve

3.11. Maintenance of the Battery

Check the battery every 100 hours of operation (for machines with HATZ engine only).

Open the cell plugs and check the electrolyte level. Add distilled water as needed, so that the electrolyte reaches up to the mark (the electrolyte must not drop below the upper edge of the plates).

Check mounting elements of the battery.

Clean the poles and the terminal clamps and apply with grease.

The battery at VVV 700 is equipped with an overflow elbow, which prevents to dripping of electrolyte from the battery. Pay care to its proper positioning.

Fig. Fastening of the battery on the machine

3.12 Wiring Scheme – HONDA Engines:

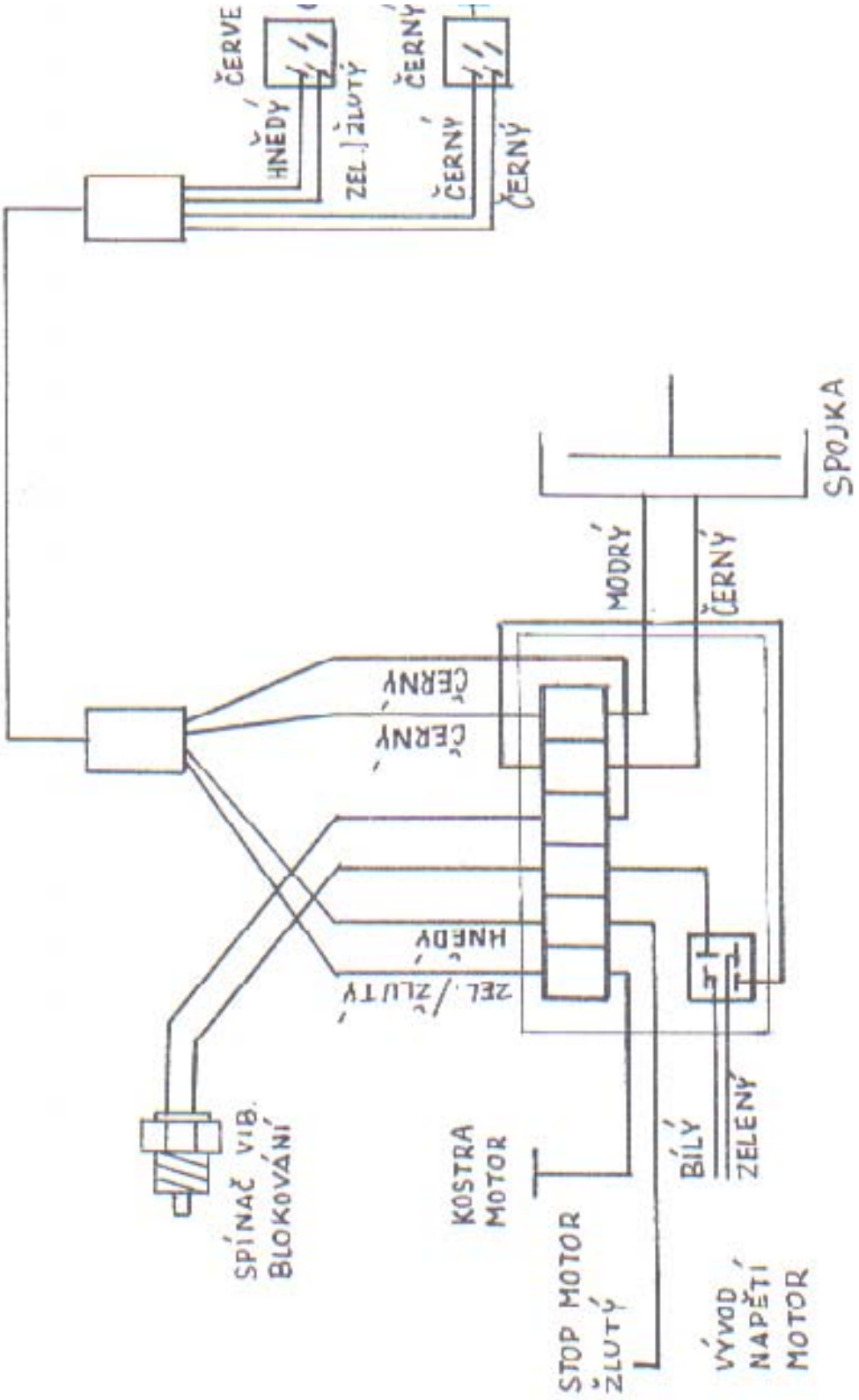


Fig. Connection of cables to the HONDA terminal board

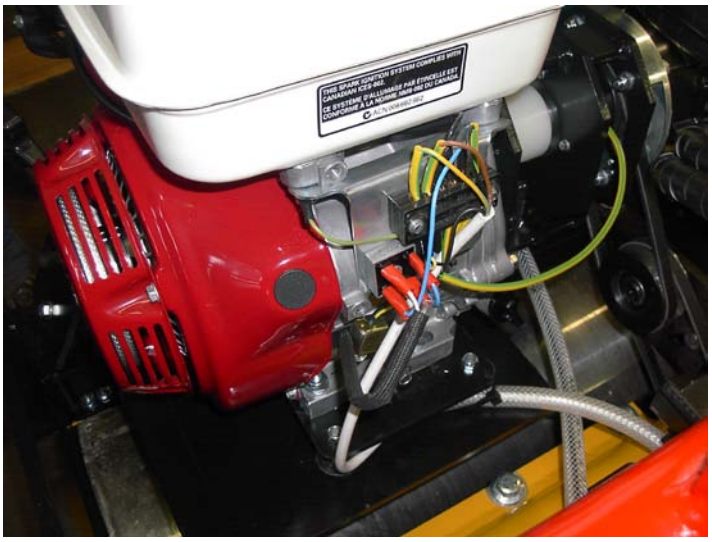


Fig. HONDA terminal board

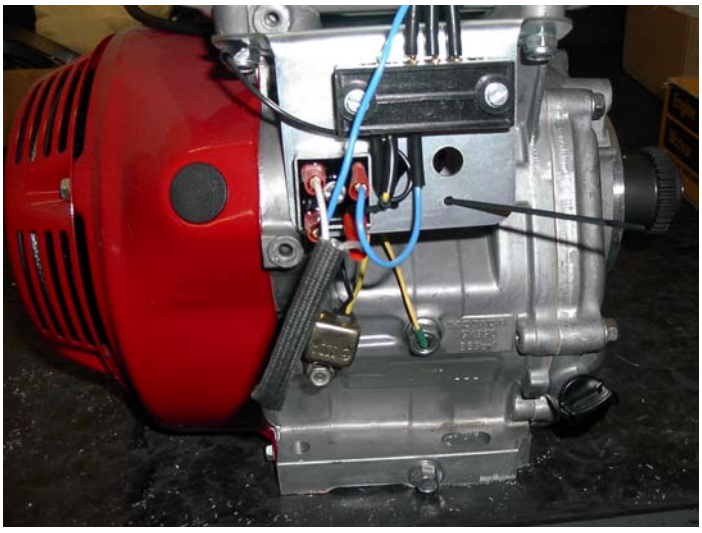
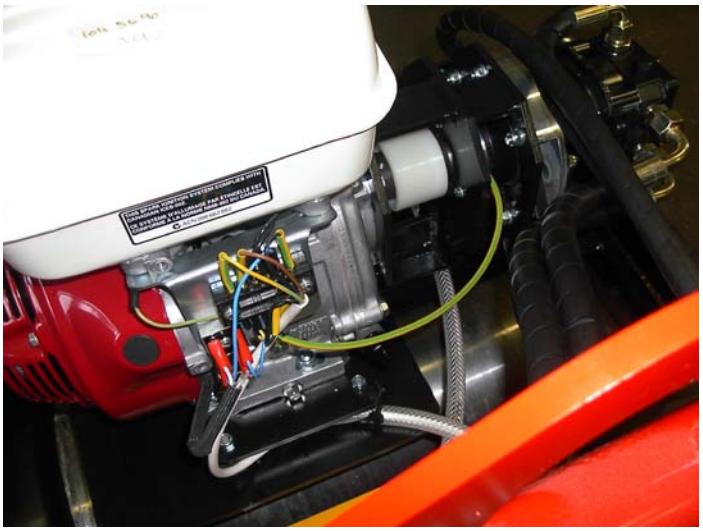


Fig. Location of cables at the clutch



3.13. Wiring Scheme – HATZ Engines

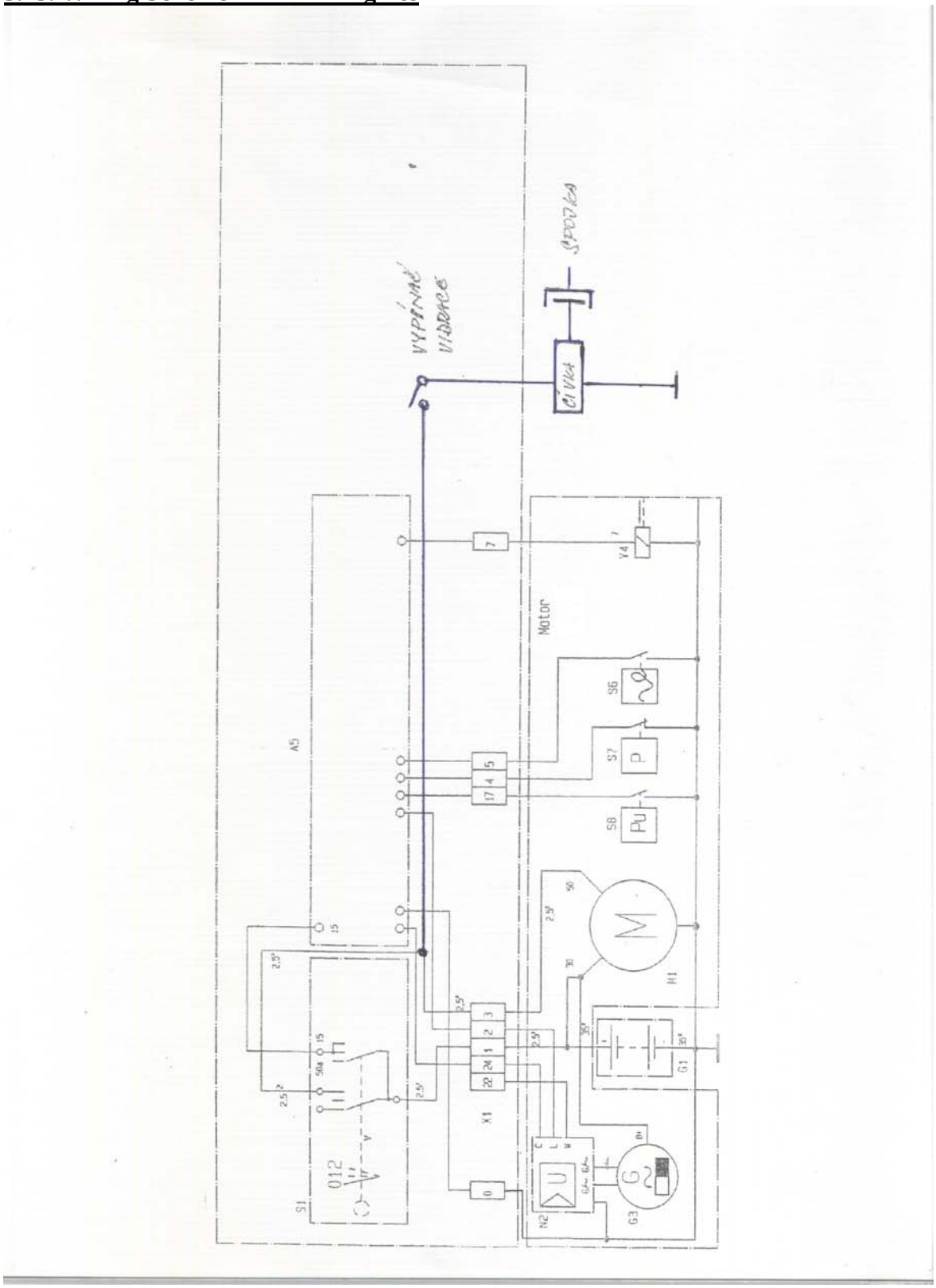
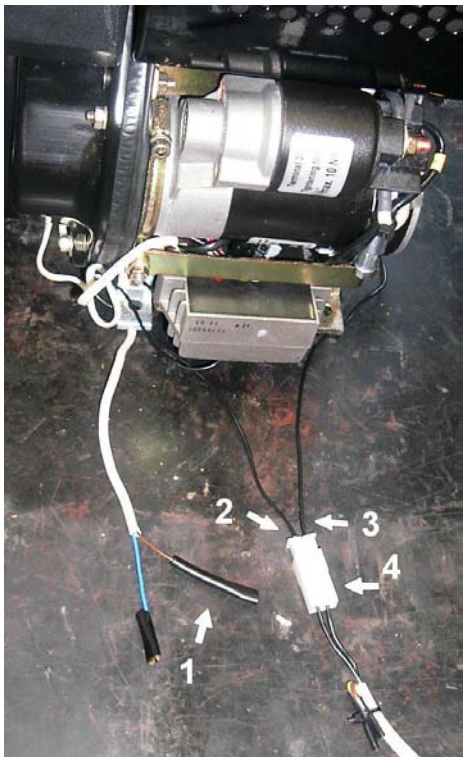


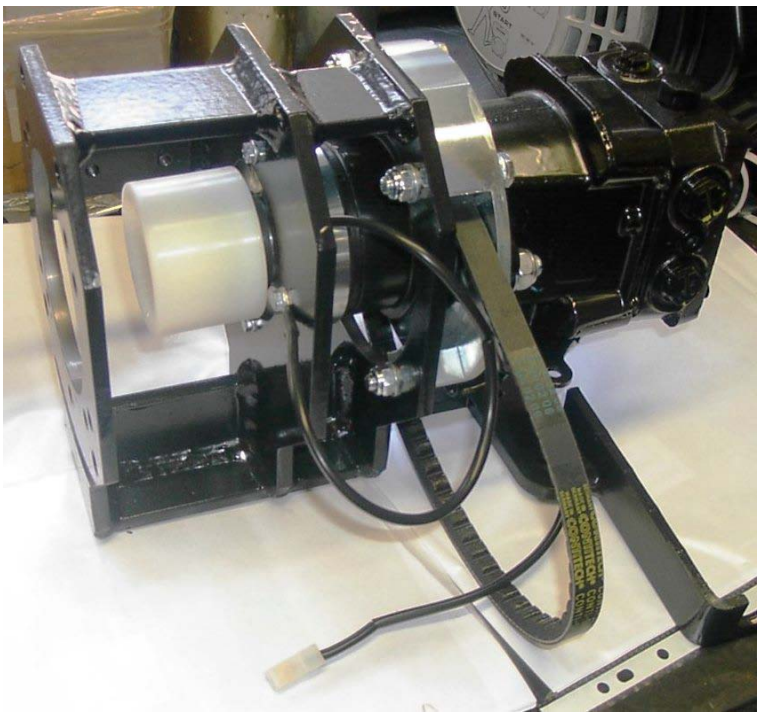
Fig. Wiring system - HATZ



1 – cable to your counter (brown)
2 – power supply
3 – wire to electromagnetic clutch
4 – wire to switch

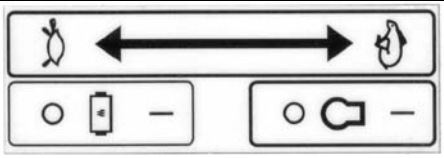
Fig. Connection of the vibration switch at the control bar (HONDA and HATZ)

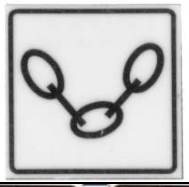
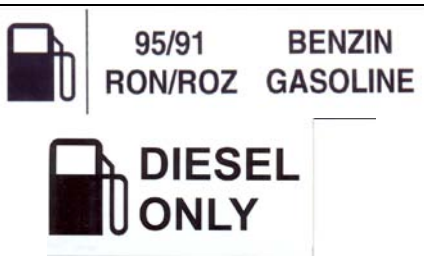
Fig. Location of cables at the electromagnetic clutch

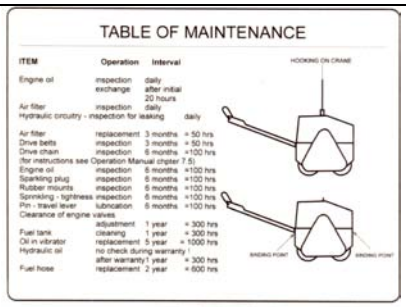
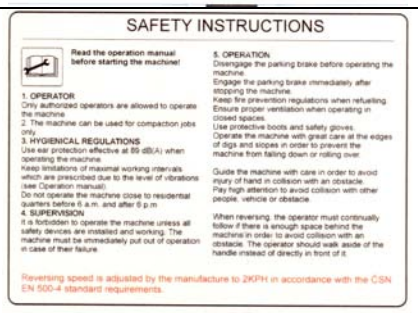
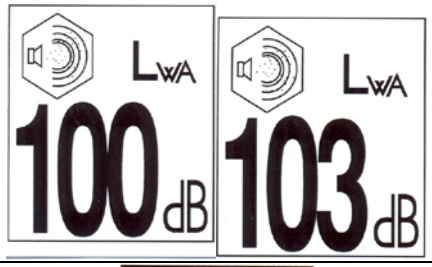


4. List of Safety Signs Used at the Machine

At the said models of walk-behind rollers type VVV 600/12(HE) a VVV 700/22(HE), there are in accordance to the law No. 22/1997 of technical requirements and its amendment No. 481/2008, used adhesive stickers with safety markings, symbols and informative texts, as specified by the respective ČSN technical standard.
In the following text, the stickers are illustrated as they appear at the machine. Each illustration is supplemented with a description.

1.	A sticker containing symbols of safety marking as per ČSN ISO 3864 (symbol No. B.2.5, NB.3.19 and NB.2.26): symbol as per ČSN ISO 6405-1 (symbol No. 7.28): symbol of graphic version of the Czech marking of conformity as per government regulation No. 179/1997 Sb, as modified by NV No. 291/2000 Sb. Information for practical operation of the machine. Safety marking, symbol No. B.2.5 that orders the operator to wear ear protection for the whole time of operation. Marking, symbol No. 7.28 issues the obligation to the operator to read the Operator's Manual before beginning the work with the machine. Safety marking, symbol No. NB.2.26 issues the obligation to the operator to use safety gloves protecting against the effects of vibration for the whole time of operation. Safety warning mark, symbol No. B.3.1 (exclamation mark) that warn the operator from the risks and dangers. Information for the operator how to proceed at repairing, cleaning or adjusting of the machine.	
2.	A sticker of warning No. NB.3.37 according to ČSN ISO 3864 (illustrates a thermometer). This symbol informs the operator, that dangerous temperatures are under the cover for the whole time of operation.	
3.	A sticker of symbol No. 8.1. according to ČSN ISO 6405-1 (the sticker marks the draining plug of engine oil).	
4.	Combined sticker containing symbols No. 6.1, 7.1 and 7.2 according to ČSN ISO 6405-1; as well as the symbols of turtle and running rabbit meaning idle run and full speed of the machine. Also contains the symbols of switch for turting the vibrator ON/OFF and switch for turning the engine OFF.	
5.	Combined sticker No. 11.6 as per ČSN ISO 6105-1. The sticker marks the marking brake.	

6.	Informative sticker „CAUTION“. Informs the operator to release the parking brake before operating the machine.	
7.	A sticker of symbol No. 7.25 according to ČSN ISO 6405-1 (a symbol marking the lifting point)	
8.	A sticker marking the points to be used when fastening the machine for transport.	
9.	A sticker illustrating the symbol of water taps of the sprinkling mechanism.	
10.	A sticker HYDRAULIC TANK informs the user of the sort of hydraulic oil.	
11.	A sticker WATER TANK informs the user of the max. capacity of the water tank.	
12.	A sticker containing information of the type of fuel suitable for the engine.	
13.	A sticker containing instructions for controlling the travel control lever.	

14.	A sticker containing the maintenance schedule and specifications, what maintenance is to be done including the service intervals.	
15.	A sticker containing the safety instructions.	
16	A sticker specifying the noise emission level as measured in accordance to NV No. 9/2002 Sb.: 100 dB – for machines with GX 200 and Hatz 1B30 103 dB – for machines with Honda GX 270 and Hatz 1B20	
17	A sticker containing information about maximal tyre inflation.	
18	A sticker marking the location of hour counter.	
19	A sticker containing information about oil level in the vibrator.	
20	A sticker marking the oil filling plug at the vibrator.	
21	A sample of sticker marking the machine type.	

5. Troubleshooting

Machines with HONDA

Failure	Reason	Remedy
Engine cannot be started or got off during operation	No fuel in the tank, closed fuel tap	Add fuel, open the tap
	Engine switch in „0“ position	Turn the switch into the „1“ position
	Wrong position of the choke lever	Choke should be turned on at cold engine and off at warm engine
	No sparkling - faulty sparkling plug	Check the sparkling plug, clean it or replace
	Clogged air filter	Check the air filter, clean it or replace
	Low oil level (oil sensor turns the engine off)	Check oil level and add oil up to the upper mark.
	Faulty oil sensor.	Can be detected by disconnecting the oil sensor. Replace the sensor if faulty.
	Disconnected electrical connectors of engine ON/OFF switch (from below the control bar)	Check electrical connection
Engine is running, the machine does not travel	Failure of the control cable	Check function of the control cable
	Faulty or dirty shock-valve.	Clean or replace the shock-valve.
	Engaged parking brake.	Release the parking brake.
	Loose or disconnected drive chain	Remove the cover and check the drive chain
	Failure of the hydraulic system	See chapter 3.10.2.
Vibration does not work (engine is running, travel is O.K.)	Loose or broken V-belt of electromagnetic clutch drive of clutch-to-vibrator drive	Tension the V-belts or replace them as needed
	Faulty switch at the control bar.	Replace the switch.
	Faulty electromagnetic clutch	Check electrical connection at the clutch, at the switch and at the engine

If the above mentioned procedure does not lead to elimination of the failure, call authorized service. When communicating with the service, always have ready the serial number of the machine.

Machines with HATZ

Failure	Reason	Remedy
Engine cannot be started or got off during operation	No fuel in the tank.	Add fuel.
	Discharged battery.	Use manual start, charge the battery.
	Clogged air filter	Check the air filter, clean it or replace
	Clogged fuel filters.	Replace the filters.
	Faulty injection pump.	Replace the pump.
	Low compression (worn engine).	Engine is worn out.
	Wrong valve clearance.	Adjust valve clearance.
	Faulty injector.	Replace.
Engine is running, the machine does not travel	Failure of the control cable	Check function of the control cable
	Faulty or dirty shock-valve.	Clean or replace the shock-valve.
	Engaged parking brake.	Release the parking brake.
	Loose or disconnected drive chain	Remove the cover and check the drive chain
	Failure of the hydraulic system	See chapter 3.10.2.
Vibration does not work (engine is running, travel is O.K.)	Manual starting was used to start the engine and the electric system is off.	Turn the ignition key to the “0” position.
	Loose or broken V-belt of electromagnetic clutch drive of clutch-to-vibrator drive	Tension the V-belts or replace them as needed
	Faulty switch at the control bar.	Replace the switch.
	Faulty electromagnetic clutch	Check electrical connection at the clutch, at the switch and at the engine

If the above mentioned procedure does not lead to elimination of the failure, call authorized service. When communicating with the service, always have ready the serial number of the machine.

6. Maintenance Schedule

Regular inspections and adjustments keep the machine in optimal technical condition.

DANGER!

Turn off the engine before carrying out any maintenance or repair work. In case the engine must be running during some procedure, secure sufficient ventilation (exhaust fumes contain dangerous carbon monoxide). Use only genuine spare parts supplied from the manufacturer. The manufacturer will not honor any warranty claims arising from use of non-original spare parts.

Item	Operation	After 1st month or initial 20 hours	Daily	Every 3 months or 50 hours	Every 6 months or 100 hours	Every 12 months or 300 hours
Engine oil	Inspection - oil level		☑			
	Exchange	☑			☑	
Visual inspection of hydraulic system for leaks			☑			
Air filter	Inspection		☑			
	Cleaning - as needed		☑			
	Exchange			☑ (1)		
V-belt	Inspection - tensioning					☑
Drive chain	Inspection - tensioning					☑
Sparkling plug	Inspection - cleaning				☑	
Rubber mounts	Inspection				☑	
Fuel hose	Inspection, replacement as needed					☑
Valve clearance	Inspection, adjustment					☑
Fuel tank and sieve	Cleaning					☑
Vibrator	Visual inspection for leaking		☑	Oil exchange - every 5 years		
Scrapers	Inspection, adjustment					☑
Sprinkling	Inspection, cleaning of water tank					☑
Travel control	Adjustment of neutral position			☑		
Battery	Inspection, electrolyte level				☑	
Fastening of control bar	Greasing					☑
Hydraulic oil	Visual inspection for leaking		☑			
	Exchange (+filter replacement)	Exchange every 2 years or 500 working hours (whichever occurs earlier).				

1. **To be done more often if operated in dusty environment!!!**
2. **These operations should be preferably done by authorized service technician.**

7. Notes: